

The Mini-Max linkage criterion introduced in the CLUSTAG is listed as one of the seventeen commonly used linkage criteria in hierarchical clustering:  
[https://en.wikipedia.org/wiki/Hierarchical\\_clustering](https://en.wikipedia.org/wiki/Hierarchical_clustering)  
 (Retrieved 9 March 2024)

The screenshot shows the Wikipedia page for "Hierarchical clustering". A table lists various linkage criteria with their mathematical formulas:

(MNSSQ) <sup>[9]</sup>	$\sum_{z \in A \cup B} d(x, z)$
Minimum Increase in Variance (MIVAR) <sup>[9]</sup>	$\mu_A \mu_B - \frac{1}{ B } \sum_{z \in B} \ x - \mu_B\ ^2$
Minimum Variance (MNVAR) <sup>[9]</sup>	
Mini-Max linkage <sup>[10]</sup>	$\min_{z \in A \cup B} \max_{y \in A \cup B} d(x, y)$
Hausdorff linkage <sup>[11]</sup>	$\max_{z \in A \cup B} \min_{y \in A \cup B} d(x, y)$
Minimum Sum Medoid linkage <sup>[12]</sup>	$\min_{m \in A \cup B} \sum_{y \in A \cup B} d(m, y)$ such that m is the medoid of the resulting cluster
Minimum Sum Increase Medoid linkage <sup>[12]</sup>	$\min_{m \in A \cup B} \sum_{y \in A \cup B} d(m, y) - \min_{m \in A} \sum_{y \in A} d(m, y) - \min_{m \in B} \sum_{y \in B} d(m, y)$
Medoid linkage <sup>[13][14]</sup>	$d(m_A, m_B)$ where $m_A, m_B$ are the medoids of the previous clusters
Minimum energy clustering	$\frac{2}{nm} \sum_{i,j=1}^{n,m} \ a_i - b_j\ _2 - \frac{1}{n^2} \sum_{i,j=1}^n \ a_i - a_j\ _2 - \frac{1}{m^2} \sum_{i,j=1}^m \ b_i - b_j\ _2$

Some of these can only be recomputed recursively (WPGMA, WPGMC), for many a recursive computation with Lance-Williams-equations is more efficient, while for other (Mini-Max, Hausdorff, Medoid) the distances have to be computed with the slower full formula. Other linkage criteria include:

- The probability that candidate clusters spawn from the same distribution function (V-linkage).
- The product of in-degree and out-degree on a k-nearest-neighbour graph (graph degree linkage).<sup>[15]</sup>

the increment of some cluster descriptor (i.e., a quantity defined for measuring the quality of a cluster) after merging two clusters.<sup>[16][17][18]</sup>

According to the following benchmarking research:  
 Xiao Hui Tai and Kayla Frisoli. Benchmarking Minimax Linkage in Hierarchical Clustering. Data Analysis and Rationality in a Complex World. Springer International Publishing, 2021.

The screenshot shows the Springer International Publishing page for the paper "Benchmarking Minimax Linkage in Hierarchical Clustering". The page includes the title, authors (Xiao Hui Tai, Kayla Frisoli), and the book it is part of, "Data Analysis and Rationality in a Complex World". There is a "Log in" button and an advertisement for AI-assisted search. The abstract section is partially visible at the bottom.

The following results have been reached:  
 "Minimax linkage was first introduced by Ao et al. (2004) in 2004, as an alternative to standard linkage methods used in hierarchical clustering ... Similarly to Bien and Tibshirani (2011), we find that minimax linkage often produces the smallest distances to prototypes, meaning that objects in a cluster are tightly clustered around their prototype. This is true across a range of values for the total number of clusters (k) ..."